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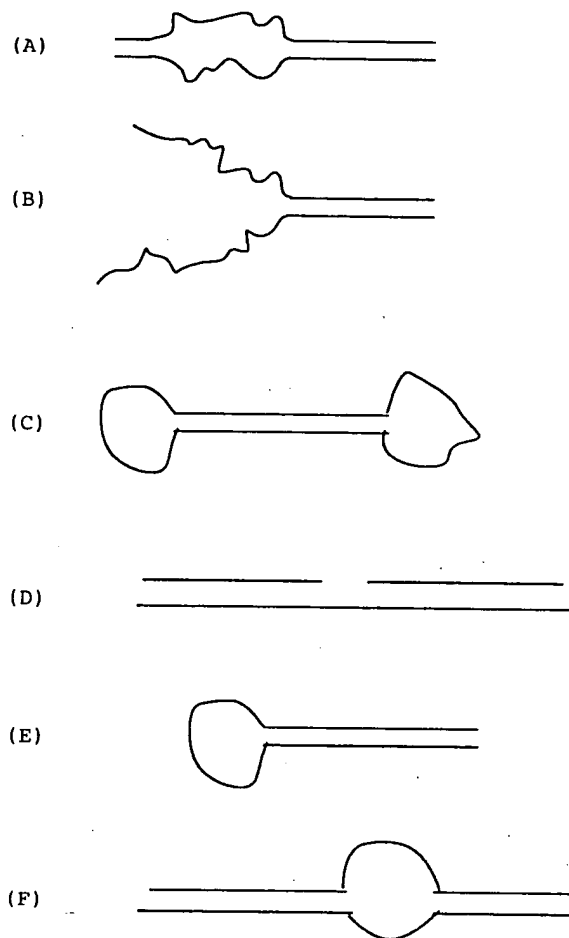


Figure 1 (A-F)

Construct Forms Comprising at Least one Single-Stranded Region

2/23

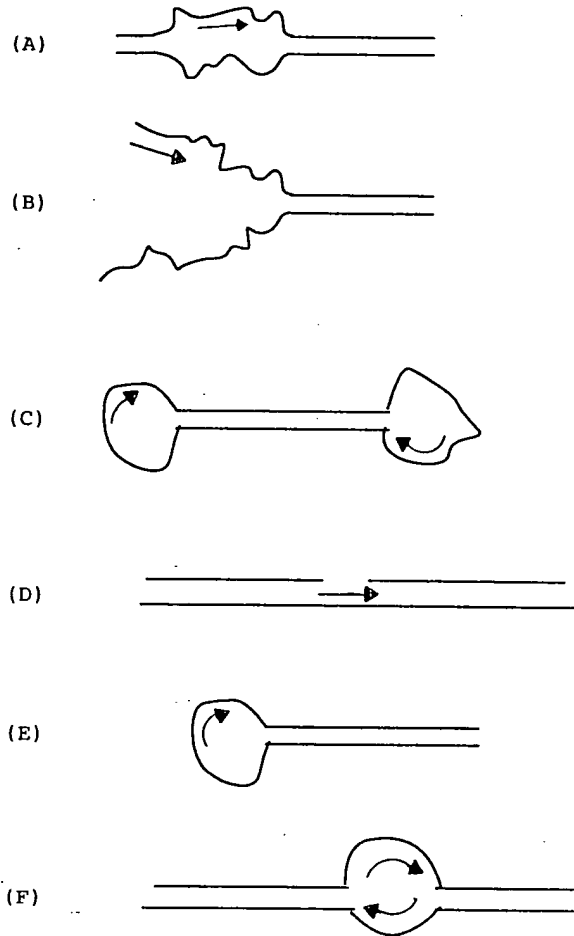


Figure 2 (A-F)

Functional Forms of the Construct

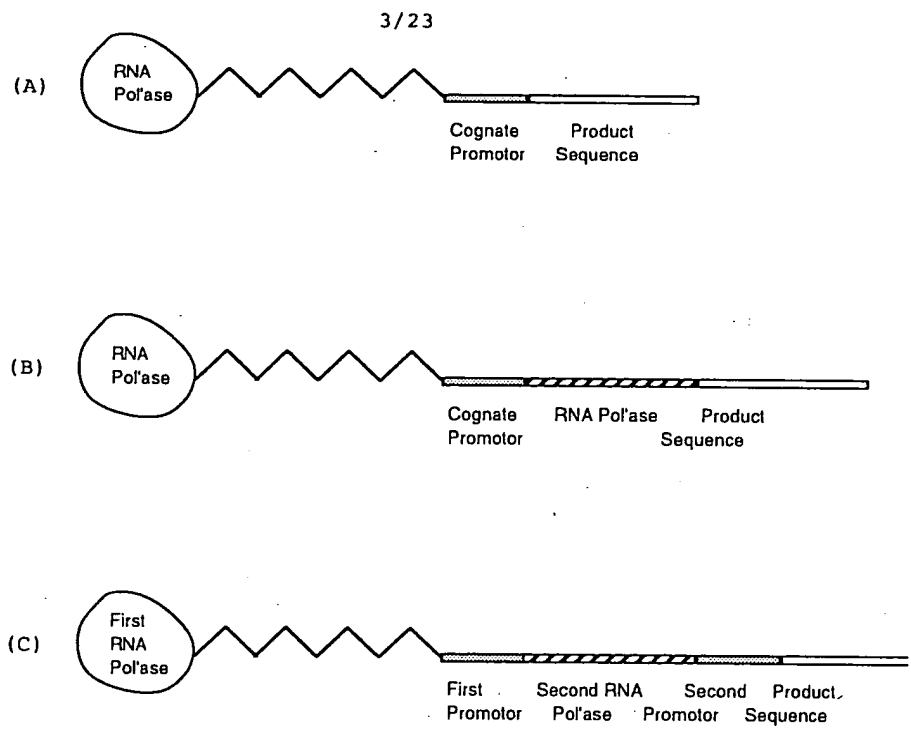


Figure 3 (A-C)

**Three Constructs with an RNA Polymerase
Covalently Attached to a Transcribing Cassette**

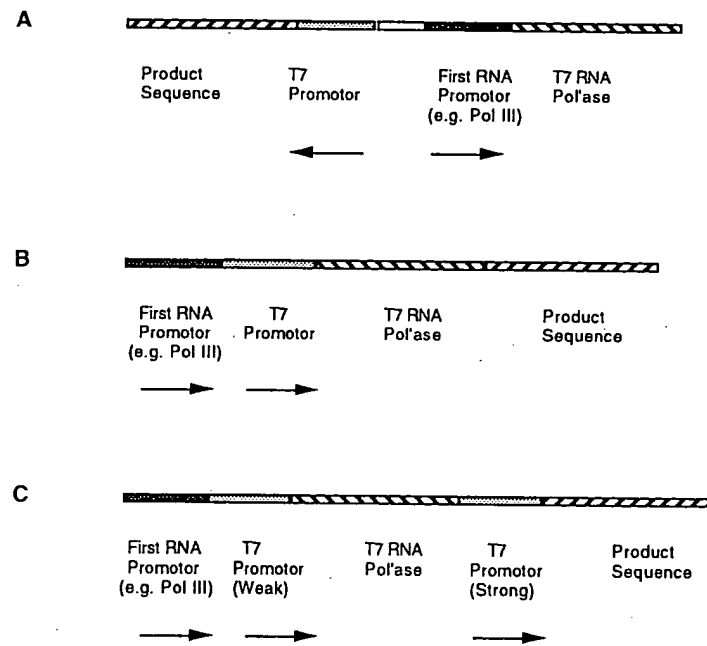


Figure 4 (A-C)

Three Constructs with Promoters for Endogenous RNA Polymerase

M13mp18. Seq Length: 7250

1.	AATGCTACTA	CTATTAGTAG	AATTGATGOC	ACCTTTTCAG	CTGGGGGGCC
51.	AAATGAAAAT	ATAGCTAAAC	AGGTTATTGA	CCATTTGCGA	AATGTATCTA
101.	ATGGTCAAAC	TAAATCTACT	CGTTGCGAGA	ATTGGGAATC	AACGTGTACA
151.	TGGAATGAAA	CTTCAGACA	CGTACTTTA	GTTGCATATT	TAAAACATGT
201.	TGAGCTACAG	CACCAGATTC	AGCAATTAAG	CTCTAAGCCA	TOGCAAAAA
251.	TGAOCTCTTA	TCAAAAGGAG	CAATTAAGG	TACTCTCTAA	TOCTGAOCTG
301.	TTGGAGTTTG	CTTOGGTCT	GGTTGCTTT	GAAGCTGSA	TAAAAAGGG
351.	ATATTTGAAG	TCTTGGGGC	TTCCTCTTA	TCTTTTGAT	GCAATTOGCT
401.	TTGCTTCTGA	CTATAATAGT	CAGGGTAAAG	ACCTGATTTT	TGATTTATGG
451.	TCATTCTCGT	TTTCTGAACT	GTTTAAAGCA	TTTGAGGGGG	ATTCAATGAA
501.	TATTTATGAC	GATTCGCGAG	TATTGGAGCG	TATOCAGTCT	AAACATTTTA
551.	CTATTACCCC	CTCTGGCAAA	ACTTCTTTTG	CAAAAGGCTC	TOGCTATTTT
601.	GGTTTTTATC	GTCGTCTGGT	AAAGAGGGT	TATGATAGTG	TTGCTCTTAC
651.	TATGCOCTGT	AATTCCTTTT	GGGTTATGT	ATCTGCATTA	GTTGAATGTG
701.	GTATTOCTAA	ATCTCAACTG	ATGAATCTTT	CTAOCGTGAA	TAATGTTGTT
751.	COGTTAGTTC	GTTTTATTAA	CGTAGATTTT	TCTTCCCAAC	GTCCTGACTG
801.	GTATAATGAG	CCAGTTCTTA	AAATGCGATA	AGGTAATTCA	CAATGATTAA
851.	AGTTGAAATT	AAACATCTC	AAGOOCAATT	TACTACTOGT	TCTGGTGTTC
901.	TOGTACGGGC	AAGCTTATT	CACTGAATGA	GCAGCTTTGT	TACGTTGATT
951.	TGGGTAATGA	ATATCOGGTT	CTTGTCGAAG	ATTACTCTTG	ATGAAGGTCA
1001	GOCAGCTAT	GOGCTGGTC	TGTACACOGT	TCATCTGTCC	TCTTTCAAAG
1051	TTGGTCAGTT	CGGTTCCCTT	ATGATTGAOC	GTCTGCGOCT	CGTTCCGGCT
1101	AAGTAACATG	GAGCAGGTGG	CGGATTTTGA	CACAATTTAT	CAGGCGATGA
1151	TACAAATCTC	CGTTGTACCTT	TGTTTGGGCG	TTGGTATAAT	CGCTGGGGGT
1201	CAAAGATGAG	TGTTTTAGTG	TATCTTTTGG	OCTCTTGTGT	TTAGGTTGG

Figure 5

M13mp18 Nucleic Acid Sequence

1251	TGCTTGTGTA	GTGGCATTAC	GTATTTTACC	CGTTTAATGG	AAACTTCTCTC
1301	ATGAAAAAGT	CTTTAGTCT	CAAAGCCTCT	GTAGCGGTG	CTAOCCTCGT
1351	TCGATGCTG	TCTTTGCTG	CTGAGGGTGA	CGATCCCGCA	AAAGGGGCT
1401	TTAACTCCT	GCAAGCTCA	GCGAOCGAAT	ATATCGGTTA	TGCTGGGGG
1451	ATGGTTGTTG	TCATTGTCGG	CGCAACTATC	GGTATCAAGC	TGTTTAAGAA
1501	ATTCACCTCG	AAAGCAAGCT	GATAAACCGA	TACAATTAAA	GGCTCTTTT
1551	GGAGCCTTTT	TTTTTGAGA	TTTCAACGT	GAAAAAATTA	TTATTCGCAA
1601	TTCCTTTAGT	TGTTCTTTC	TATTCTCACT	CGCTGAAAC	TGTTGAAAGT
1651	TGTTTAGCAA	AACCCATAC	AGAAAATTCA	TTTACTAACG	TCTGGAAAGA
1701	CGACAAACT	TTAGATCGTT	ACGCTAACTA	TGAGGGTTGT	CTGTGGAATG
1751	CTACAGGGT	TGTAGTTTGT	ACTGGTGAAG	AAACTCAGTG	TTACGGTACA
1801	TGGGTTCTA	TTGGGCTTGC	TATCCTGAA	AATGAGGGTG	GTGGCTCTGA
1851	GGGTGGGGT	TCTGAGGGTG	GCGGTTCTGA	GGGTGGGGT	ACTAAACCTC
1901	CTGAGTAAG	TGATACAAC	ATTCGGGGCT	ATACTTATAT	CAACCTCTC
1951	GAGGGCACTT	ATCAGCTG	TACTGAGCAA	AACCGCTA	ATCCTAATCC
2001	TCTCTTGAG	GAGTCTCAGC	CTCTTAATAC	TTTCATGTTT	CAGAATAATA
2051	GGTTCCGAAA	TAGGCAGGG	GCATTAAC	TTTATACGGC	CACTGTTACT
2101	CAAGGCACTG	AACCGTTAA	AACTTATTAC	CAGTACACTC	CTGTATCATC
2151	AAAAGCCATG	TATGAAGCTT	ACTGGAAGG	TAAATTCAGA	GACTGCGCTT
2201	CAAGGCACTG	AACCGTTAA	AACTTATTAC	CAGTACACTC	CTGTATCATC
2151	AAAAGCCATG	TGCTCAAC	TCTGTCAAT	GCTGGGGGG	GCTCTGGTGG
2201	TGCTCTGAG	CTTTAATCAA	GATCATTG	TTTGTGAATA	TCAAGGCCAA
2251	TGCTCTGAG	TGCTCAAC	TCTGTCAAT	GCTGGGGGG	GCTCTGGTGG
2301	TGGTCTGGT	GGGGCTCTG	AGGGTGGTGG	CTCTGAGGGT	GGGGTCTCTG
2351	AGGGTGGGG	CTCTGAGGGA	GGGGTTTGG	GCTGGGCTC	TGGTTGGGT
2401	GATTTTGATT	ATGAAAAGAT	GGCAACGCT	AATAAGGGGG	CTATGAACGA
2451	AAATGCGAT	GAAAACGGC	TACAGTCTGA	CGCTAAAGGC	AACTTGATT

Figure 5

M13mp18 Nucleic Acid Sequence

```

2501 CTGTGCTAC TGATTAAGGT GCTGCTATCG ATGGTTTCAT TGGTGAOGTT
2551 TOGGGOCCTG CTAATGGTAA TGGTGCTACT GGTGATTTTG CTGGCTCTAA
2601 TTOCCAAATG GCTCAAGTCG GTGAOGGTGA TAATTCAOCT TTAATGAATA
2651 ATTTGCGTCA ATATTTACCT TCOCTCOCTC AATGGGTTGA ATGTGGOOCT
2701 TTTGTCTTTA GCGCTGGTAA AOCATATGAA TTTTCTATTG ATTGTGACAA
2751 AATAAACTTA TTOGTGGTG TCTTTGCGTT TCTTTTATAT GTTGCOAOCT
2801 TTATGTATGT ATTTTCTACG TTTGCTAACA TACTGCGTAA TAAGGAGTCT
2851 TTATCATGOC AGTTCTTTTG GGTATTOOCT TATTATTGCG TTTOCTOGGT
2901 TCOCTTCTGG TAACTTTGTT OGGCTATCTG CTTACTTTTC TAAAAAGGG
2951 CTTOGGTAAG ATAGCTATTG CTATTTCACT GTTCTTGCT CTTATTATTG
3001 GGCTTAACTC AATTCTTGTG GGTATCTCT CTGATATTAG CGCTCAATTA
3051 COCTCTGACT TTGTTCAAGG TGTTCACTTA ATTCTOOOCT CTAATGOGCT
3101 TCOCTGTTTT TATGTTATTC TCTCTGTAAA GGCTGCTATT TTCATTTTTG
3151 ACGTTAAACA AAAAATOGTT TCTTATTTGG ATTGGGATAA ATAATATGGC
3201 TGTTTATTTT GTAACGGCA AATTAGGCTC TGGAAAGACG CTGTTAGOG
3251 TTGGTAAGAT TCAGGATAAA ATTGTAGCTG GGTGCAAAAT AGCAACTAAT
3301 CTTGATTTAA GGCTTCAAAA OCTOOOGCAA GTGGGAGGT TOGCTAAAAC
3351 GOCTOGCGTT CTTAGAATAC CGGATAAGOC TTCTATATCT GATTTGCTTG
3401 CTATTGGGCG CGGTAATGAT TOCTAOGAATG AAAATAAAAA CGGCTTGCTT
3451 GTTCTOGATG AGTGGGTAC TTGGTTTAAT ACOGTTCTT GGAATGATAA
3501 GGAAAGACAG CCGATTATTG ATTGGTTTCT ACTGCTOCT AAATTAGGAT
3551 GGGATATTAT TTTTCTTGTT CAGGACTTAT CTATTGTTGA TAAACAGGCG
3601 CGTTCTGCAT TAGCTGAACA TGTTGTTTAT TGTOGTGTC TGGACAGAAT
3651 TACTTTACCT- TTTGTGGTA CTTTATATTC TCTTATTACT GGCTOGAAAA
3701 TGCTCTGOC TAAATTACAT GTTGGGTTG TTAATATGG CGATTCTCAA
3751 TTAAGCOCTA CTGTTGAGCG TTGGCTTTAT ACTGGTAAGA ATTTGTATAA
3801 CGCATATGAT ACTAAACAGG CTTTTTCTAG TAATTATGAT TCOGGTGTTT

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Figure 5

M13mp18 Nucleic Acid Sequenc


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3851 ATTCTTATTT AACGCTTAT TTATCACAAG GTGGGTATTT CAAACCATTA
3901 AATTTAGGTC AGAAGATGAA ATTAACATAA ATAATATTGA AAAAGTTTTC
3951 TOGGTTCTTT TGTCTTGGGA TTGGATTGTC ATCAGCATTT ACATATAGTT
4001 ATATAAOCOA AOCTAAGCOG GAGGTTAAAA AGGTAGTCTC TCAGACCTAT
4051 GATTTTGATA AATTCACATAT TGACTCTTCT CAGGCTCTTA ATCTAAGCTA
4101 TCGCTATGTT TTCAAGGATT CTAAGGGAAA ATTAATTAAT AGCGAOGATT
4151 TACAGAAGCA AGGTTATTCA CTCACATATA TTGATTTATG TACTGTTTCC
4201 ATTAATAAAG GTAATTCAAA TGAAATTGTT AAATGTAATT AATTTTGTTT
4251 TCTTGATGTT TGTTCATCA TCTTCTTTTG CTCAGGTAAT TGAAATGAAT
4301 AATTGOGCTC TGOGCGATTT TGTAACCTGG TATTCAAAGC AATCAGGOGA
4351 AATCGGTTATT GTTCTCOOG ATGTAAAAGG TACTGTTACT GTATATTCAT
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4751 AAAGATATTT TAGATAAOCCT TOCTCAATTC CTTTCTACTG TTGATTTGCC
4801 AACTGAOCAG ATATTGATTG AGGGTTTGAT ATTTGAGGTT CAGCAAGGTG
4851 ATGCTTTAGA TTTTTCATTT GCTGCTGGCT CTCAGGTTGG CACTGTTGCA
4901 GGGGTTGTTA ATACTGAOCG OCTCAOCTCT GTTTTATCTT CTGCTGGTGG
4951 TTOGTTGGT ATTTTAAATG GCGATGTTTT AGGGCTATCA GTTGGGOCAT
5001 TAAAGACTAA TAGOCATTCA AAAATATTGT CTGTGOCACG TATTCTTAOCG
5051 CTTTCAGGTC AGAAGGGTTC TATCTCTGTT GGOCAGAATG TCCCTTTTAT
5101 TAAAGACTAA TAGOCATTCA AAAATATTGT CTGTGOCACG TATTCTTAOCG
5151 OGATTGAGOG TCAAAATGTA GGTATTTCCA TGAGOGTTTT TCCTGTTGCA

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Figure 5

M13mp18 Nucleic Acid Sequence

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5201 ATGGCTGGCG GTAATATTGT TCTGGATATT AOCAGCAAGG COGATAGTTT
5251 GAGTTCTCT ACTCAGGCAA GTGATGTTAT TACTAATCAA AGAAGTATTG
5301 CTACAAOOGT TAATTTGOGT GATGGACAGA CTCTTTTACT OGGTGGOCTC
5351 ACTGATTATA AAAACACTTC TCAAGATTCT GGOGTACOGT TOCTGTCTAA
5401 AATOCCTTTA ATOGGOCTOC TGTTTAGCTC OOGCTCTGAT TOCAAOGAGG
5451 AAAGCAOGTT ATACGTGCTC GTCAAAGCAA OCATAGTAOG CGOOCCTGAG
5501 OGGOGCATT AOGOGGOGG GTGTGGTGGT TAGOGGCAGC GTGAOOGCTA
5551 CACTTGOCAG OGOOCTAGOG OOGGCTOCTT TCGCTTTCTT COCTTOCTTT
5601 CTGOCACOGT TOGOGGCTT TCOOOGTCAA GCTCTAAATC GGGGGCTOOC
5651 TTTAGGGTTC OGATTTAGTG CTTTAOGGCA OCTOGAOCOC AAAAAACTTG
5701 ATTTGGGTGA TGGTTCAOGT AGTGGGOCAT OGOOCTGATA GACGGTTTTT
5751 OGOOCTTTGA OGTTGAGTC CAOGTTCTTT AATAGTGGAC TCTTGTTOCA
5801 AACTGGAACA AACTCAAOC CTATCTOGGG CTATTCTTTT GATTTATAAG
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6001 GGOGOCAAT AOGCAAOOG OCTCTOOOOG OGOGTTGGOC GATTCATTAA
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6101 OGCAATTAAT GTGAGTTAGC TCACTCATTA GGCACOCAG GCTTTACT
6151 TTATGCTTCC GGCTOGTATG TTGTGTGGAA TTGTGAGOGG ATAACAATTT
6201 CACACAGGAA ACAGCTATGA OCATGATTAC GAATTOGAGC TOGGTACOOG
6251 GOGATCTCT AGAGTOGAOC TGCAGGCATG CAAGCTTGGC ACTGGOOGTG
6301 GTTTTACAAC GTGTGACTG GGA AAAOCT GOGTTAOC AACTTAATOG
6351 OCTTGACGA CAATCOOCTT TOGOCAGCTG GOGTAATAGC GAAGAGGOOC
6401 GCACOGATOG COCTTOCAA CAGTTGOGCA GOGTGAATGG OGAATGGOGC
6451 TTTGCTGGT TTGGGCACG AGAAGOGGTG OOGGAAAGCT GGCTGGAGTG
6501 OGATCTOCT GAGGOOGATA OGGTGTGTG COOCTCAAAC TGCAGATGC

```

Figure 5

M13mp18 Nucleic Acid Sequence

6551	ACGGTTAOGA	TGOGGOCATC	TACAOCACG	TAAOCTATCC	CATTACGGTC
6601	AATCOGGOGT	TTGTTCCAC	GGAGAATCOG	ACGGGTTGTT	ACTOGCTCAC
6651	ATTTAATGTT	GATGAAAGCT	GGCTACAGGA	AGGOCAGACG	CGAATTATTT
6701	TTGATGGOGT	TOCTATTGGT	TAAAAAATGA	GCTGATTTAA	CAAAAATTTA
6751	ACGCGAATTT	TAACAAAATA	TTAACGTTTA	CAATTTAAAT	ATTTGCTTAT
6801	ACAATCTTCC	TGTTTTTGGG	GCTTTTCTGA	TTATCAACCG	GGGTACATAT
6851	GATTGACATG	CTAGTTTTAC	GATTACGGTT	CATCGATTCT	CTTGTTTGCT
6901	CCAGACTCTC	AGGCAATGAC	CTGATAGCCT	TTGTAGATCT	CTCAAAAATA
6951	GCTAOCCTCT	COGGCATGAA	TTTATCAGCT	AGAACGGTTG	AATATCATAT
7001	TGATGGTGAT	TTGACTGTCT	COGGCCTTTC	TCACCCTTTT	GAATCTTTAC
7051	CTACACATTA	CTCAGGCATT	GCATTTAAAA	TATATGAGGG	TTCTAAAAAT
7101	TTTTATCCTT	GCGTTGAAAT	AAAGGCTTCT	COCGCAAAAG	TATTACAGGG
7151	TCATAATGTT	TTTGGTACAA	COGATTTAGC	TTTATGCTCT	GAGGCTTTAT

Figure 5

M13mp18 Nucleic Acid Sequence

COMPLEMENTARY TO M13			
POSITION	5' . . . 3'	POSITION	
645	AGCAACACTATCATA	631	M13/1
615	ACGACGATAAAAAAC	601	M13/2
585	TTTTGCAAAAGAAGT	571	M13/3
555	AATAGTAAAATGTTT	541	M13/4
525	CAATACTGCGGAATG	511	M13/5
495	TGAATCCCCCTCAAA	481	M13/6
465	AGAAAACGAGAATGA	451	M13/7
435	CAGGTCTTTACCGTG	421	M13/8
405	AGGAAAGCGGATTGC	391	M13/9
375	AGGAAGCCCGAAAGA	361	M13/10
COMPLEMENTARY TO SS PHAGE DNA			
POSITION	5' . . . 3'	POSITION	
351	ATATTTGAAGTCTTT	366	M13/11
371	TCCTTTTGATGCAAT	386	M13/12
391	CTATAACTCTCAGGG	406	M13/13
411	TGATTTATGGTCATT	426	M13/14
431	GTTTAAAGCATTTGA	446	M13/15
451	TATTTATGACGATTTC	466	M13/16
471	TATCCAGTCTAAACA	486	M13/17
491	CTCTGGCAAACTTC	506	M13/18
511	TCGCTATTTTGGTTT	526	M13/19
531	AAACGAGGGTTATGA	546	M13/20

Figure 6

Primers for Nucleic Acid Production
Derived from M13mp18 Sequence

12/23

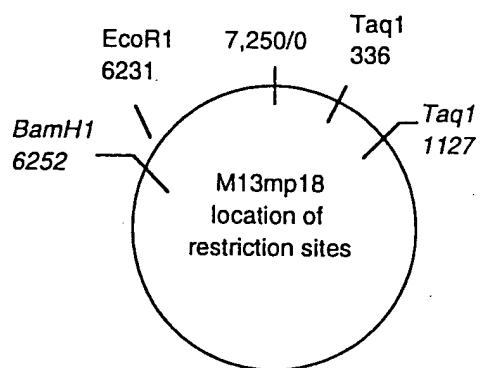
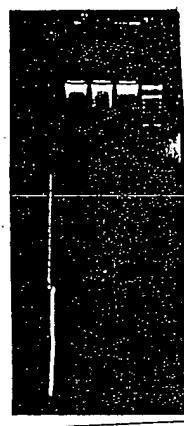


Figure 7

Appropriate M13mp18 Restriction Sites



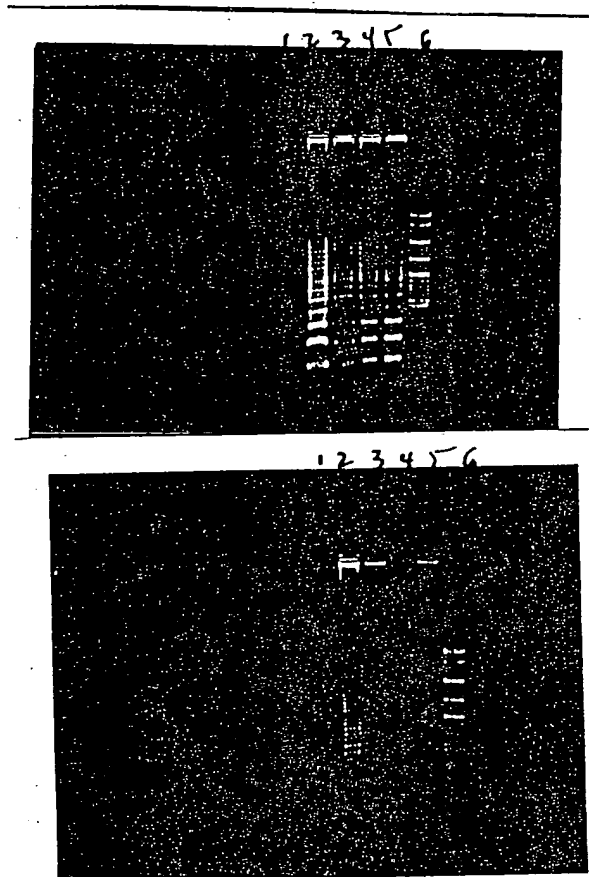
Lane 1: from calf thymus + Taq digested mp18 amplification reaction
Lane 2: from Taq digested mp18 amplification reaction
Lane 3: from calf thymus amplification reaction
Lane 4: øX174 Hinf1 size marker

Figure 8



Lane 1: no template
Lane 2: mp18 template, phosphate buffer
Lane 3: MspI/pBR322 size marker
Lane 4: mp18 template, MOPS buffer

Figure 9



Top= (+) Template

Bottom= (-) Template

Lane 1: phosphate buffer

Lane 2: MES

Lane 3: MOPS

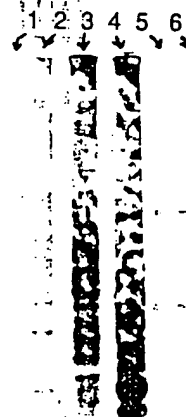
Lane 4: DMAB

Lane 5: DMG

Lane 6: pBR322/Mspl size marker

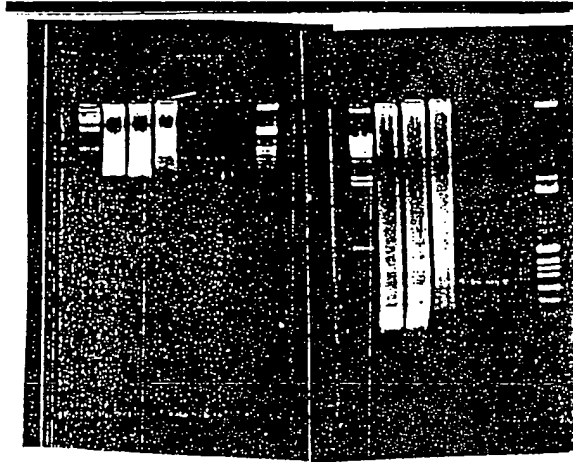
Figure 10

16/23



Lane 1: DMAB buffer, no template
Lane 2: DMAB buffer, mp18 template
Lane 3: DMG buffer, no template
Lane 4: DMG buffer, mp18 template
Lane 5: No reaction
Lane 6: 200 ng Taq I digested mp18
size marker/positive control

Figure 11



First Time Interval Second Time Interval

Agarose Gel Analysis

- Lane 1: lambda Hind III marker
- Lane 2: Amp/Untreated
- Lane 3: Amp/Kinased
- Lane 4: Amp/Kinased/Ligated
- Lane 5: PCR/Untreated
- Lane 6: PCR/Kinased
- Lane 7: PCR/Kinased/Ligated
- Lane 8: ϕ X174/Hinf1 marker

Figure 12

18/23

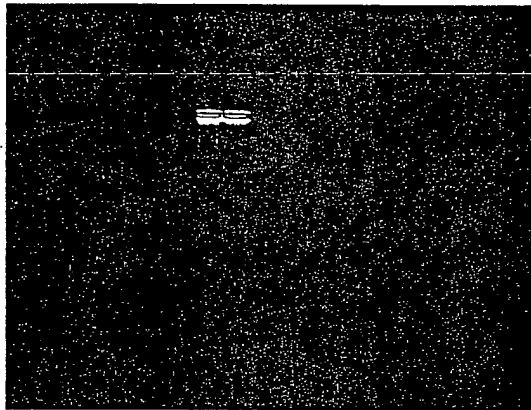
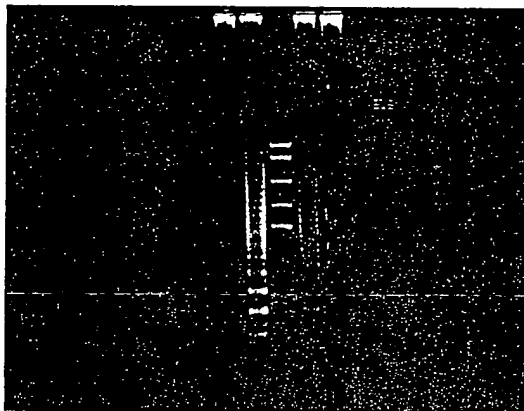


Figure 13

19/23

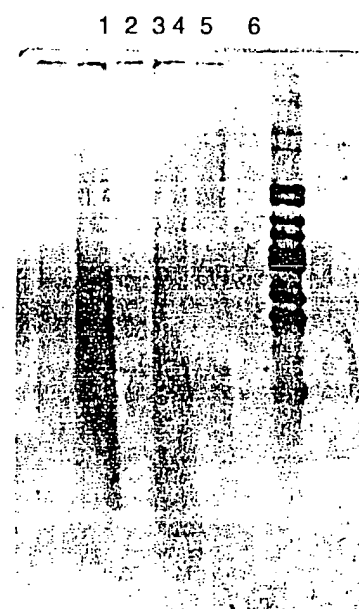
1 2 3 4 5 6



Lane 1: Primers alone
Lane 2: Primers + taq digested M13 DNA
Lane 3: Molecular weight markers
Lane 4: Primers + RNA
Lane 5: Primers alone
Lane 6: M13 digested DNA
Buffer was dimethyl amino glycine, pH 8.6

Figure 14

20/23



Lane 1: Primers alone
Lane 2: Primers + taq digested M13 DNA
Lane 3: Molecular weight markers
Lane 4: Primers + RNA
Lane 5: Primers alone
Lane 6: M13 digested DNA
Buffer was dimethyl amino glycine, pH 8.6

Figure 15

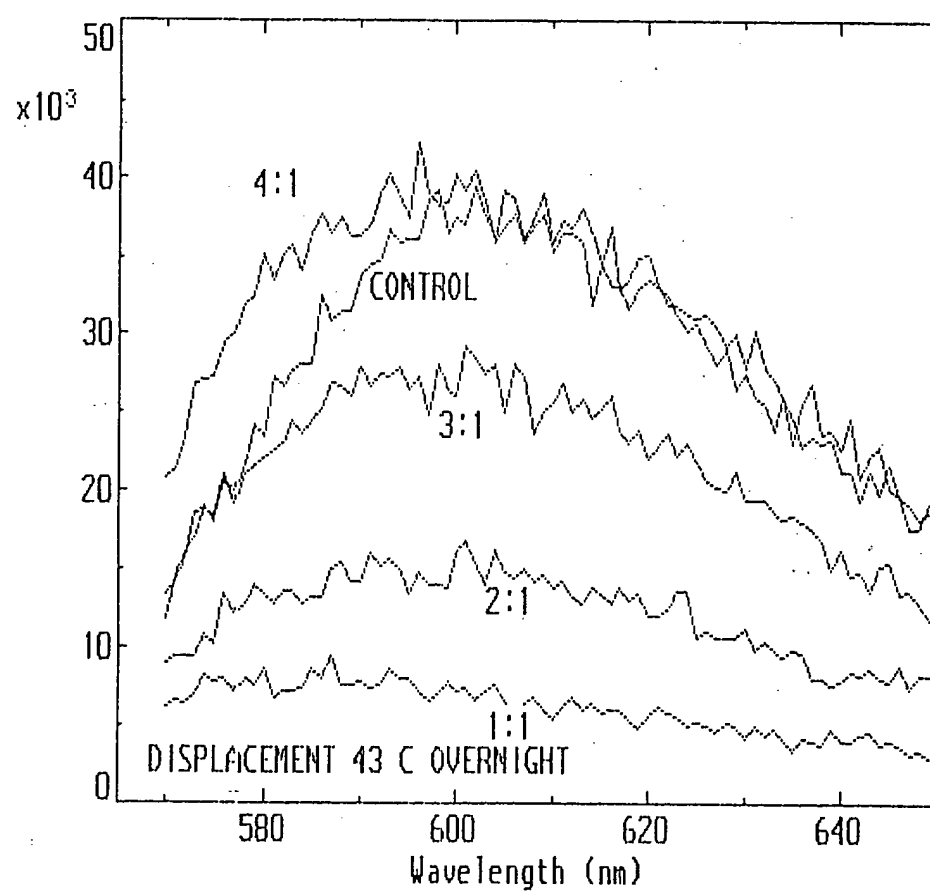


Figure 16

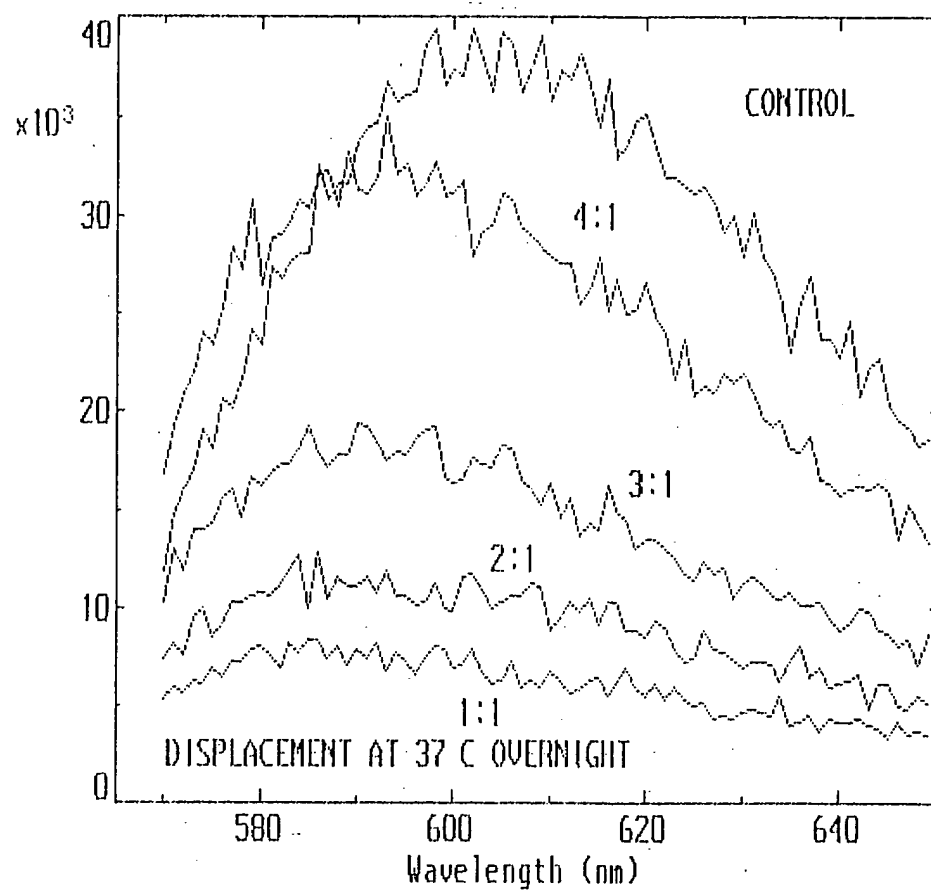


Figure 17

pIBI 31-BH5-2

fmet AUG of Lac z (T7 Promotor region....

LAC PROMOTOR..ATG ACC ATG ATT ACG CCA GAT ATC AAA TTA ATA CGA CTC ACT ATA

oligo 50-mer 3'- tac t'aa t'gc ggt' ct'a t'ag t'Vl aat' tat' gct' gag . t'ga t'at' c-5'

10 base insert

T7 RNA Start («« T3 Promotor Region)
IGGG CTC ICCT TTA GTG ACG GTT AAT
...»») «- T3 Start Signal

pIBI 31 BSII/HCV

fmet AUG of Lac z (T3 Promotor region --) T3 RNA Start
 LAC PROMOTOR _ATG ACC ATG ATT ACG CCA AGC TCG AAA TTA ACC CTC ACT AAA /GGG
 oligo 50-mer 3'- tac t'aa t'ac t'aa t'gc ggi' t'V--10 base insert--.....

(← T7 Promotor Region)
 MULTIPLE CLONING SITE + 390 BASE INSERT CTA /TAG TGA GTC CGT ATT AAT....
 ← T7 Start Signal
 5'-ct'a t'ag t'ga gt'c gt'a tt'a at'.....

Figure 18